

Amphibian and Reptile Survey on Montana Refuges: 1996

A Report to:

US Fish and Wildlife Service

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Submitted by

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ABSTRACT

A total of 37 site surveys were made between May and July 1996 on lands administered by the U.S. Fish and Wildlife Service in north-central Montana. Localized areas across the entire region were covered in the survey; included during the 1996 inventory were 9 Waterfowl Protection Areas (WPAs) and 6 National Wildlife Refuge (NWR's). Most were surveys, usually made by 1 individual, of ponds, lakes, seeps, streams or other wetlands. Each survey took 6-120 person-minutes and consisted of a thorough search of the wetland perimeter and netting of near shore aquatic habitats for adults, eggs, larvae, and tadpoles. Stream sampling, when conducted, was done by hand and dipnet. Seeps were checked by rolling over rocks and logs in and near wet areas. In addition to surveys, sightings were made from road kills, vocal identifications or fortuitous sightings by other reliable individuals. An additional 132 wetlands (permanent or temporary) were surveyed, and 36 opportunistic observations were made, in the region encompassing the USFWS units.

Five amphibian species and three reptile species were detected during the 1996 site surveys. Amphibian and reptile species, and number of WPA/NWR's ("units") where detected, included Tiger Salamander (*Ambystoma tigrinum*) at 3 units, Western Chorus Frog (*Pseudacris triseriata*) at 11 units, Woodhouse's Toad (*Bufo woodhousii*) at 1 unit, Great Plains Toad (*Bufo cognatus*) at 1 unit, Northern Leopard Frog (*Rana pipiens*) at 1 unit, Painted Turtle (*Chrysemys picta*) at 3 units, Common Garter Snake (*Thamnophis sirtalis*) at 1 unit, and Plains Garter Snake (*Thamnophis radix*) at 2 units. Opportunistic encounters added three species detected on USFWS units in 1996: Western Hognose Snake (*Heterodon nasicus*), Racer (*Coluber constrictor*), Gopher Snake (*Pituophis catenifer*). Other wetland surveys and opportunistic encounters in the region in 1996 included three additional species (one amphibian and two snake species) not recorded at the USFWS units during the inventory: Plains Spadefoot (*Scaphiopus bombifrons*), Western Terrestrial Garter Snake (*Thamnophis elegans*), Western Rattlesnake (*Crotalus viridis*).

Greatest detected diversity was on or near Charles M. Russell National Wildlife Refuge (CMR), which included all species encountered in 1996 except Plains Garter Snake; this species was detected on the adjacent UL Bend NWR, however, and probably occurs on the CMR as well. Almost 33% of all site surveys during the 1996 inventory were on or near the CMR, which is the largest unit on which site surveys were conducted. No amphibians or reptiles were noted on three USFWS units, one species on five units, two species on 4 units, three species on one unit, and seven species on one unit. For all (37) site surveys, no species were detected on 12, one species on 15, two species on 6, three species on 3, and four species on 1.

Historical records and earlier surveys indicated the presence of four additional species on USFWS lands not encountered during the 1996 surveys: Plains Spadefoot, Spiny Softshell (*Trionyx spiniferus*), Short-horned Lizard (*Phrynosoma douglasi*), Western Rattlesnake.

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Museum records were received from: American Museum of Natural History, Academy of Natural Science, Brigham Young University, California Academy of Science, Carnegie Museum, University of Puget Sound Museum, Field Museum of Natural History, Glacier National Park Museum, Illinois Natural History Survey, University of Kansas, Los Angeles County Museum, Louisiana State University Museum of Zoology, Museum of Comparative Zoology - Harvard, Milwaukee Public Museum, Montana State University Museum, Michigan State University Museum, North Carolina State Museum of Natural History, Northern Louisiana University Museum, University of Colorado Museum, University of Georgia Museum of Natural History, University of Idaho Museum, University of Michigan Museum, University of South Dakota, United States National Museum of Natural History, University of Texas - Arlington, University of Texas - El Paso, and Peabody Museum - Yale. Most museum data were received with the help of Dr. Charles Peterson, Idaho State University, Pocatello.

Jim Reichel died prior to the completion of this report. Jim was instrumental in organizing and conducting a series of amphibian and reptile surveys across Montana, the first comprehensive effort in three decades. This report represents one of a series of projects that contribute to a baseline inventory of the entire state.

INTRODUCTION

Many amphibians are apparently declining in the western U.S. and world-wide. Acid rain, ozone depletion, pollution by toxic chemicals and heavy metals, predation and/or competition by exotic species, habitat alteration, climatic changes, disease, immune system problems, and combinations of several of these factors have all been suggested as possible causes (Corn and Fogelman 1984, Phillips 1990, Yoffe 1992).

Preliminary data indicate that the Northern Leopard Frog (*Rana pipiens*) has disappeared over much of its former range in western Montana and is declining in at least some areas of eastern Montana. Status and population trends of several toad species (*Bufo* spp.) are unknown, although declines of the Western Toad (*Bufo boreas*) have recently been reported in northern Idaho (C. Peterson pers. comm.), northwestern Montana (Werner and Reichel 1994), Yellowstone National Park (Koch and Peterson 1995) and Colorado (Carey 1993). Land-use practices, such as large-scale logging, continue to be detrimental to resident herpetofauna in some regions of the western U.S. (Bury *et al.* 1991), while the impacts of grazing on amphibians and reptiles and their habitats remain poorly studied and understood. Heavy grazing in and around breeding waters may also negatively impact amphibians and reptiles living in riparian and wetland sites by 1) eliminating emergent vegetation necessary for egg and larval survival, 2) lowering water quality, especially causing high siltation levels, 3) soil compaction and trampling of turtle eggs, and 4) trampling of eggs, larvae and adults. Additionally, "improving" seeps and springs for livestock watering may make them unavailable to breeding amphibians.

The Montana Natural Heritage Program currently (1997) lists five amphibian and five reptile species as Animal Species of Special Concern. Of these, Canadian Toad (*Bufo hemiophrys*), Northern Leopard Frog (*Rana pipiens*), Snapping Turtle (*Chelydra serpentina*), Spiny Softshell (*Trionyx spiniferus*), Western Hognose Snake (*Heterodon nasicus*) and Milk Snake (*Lampropeltis triangulum*) occur or potentially occur in the region of focus in this report.

METHODS AND MATERIALS

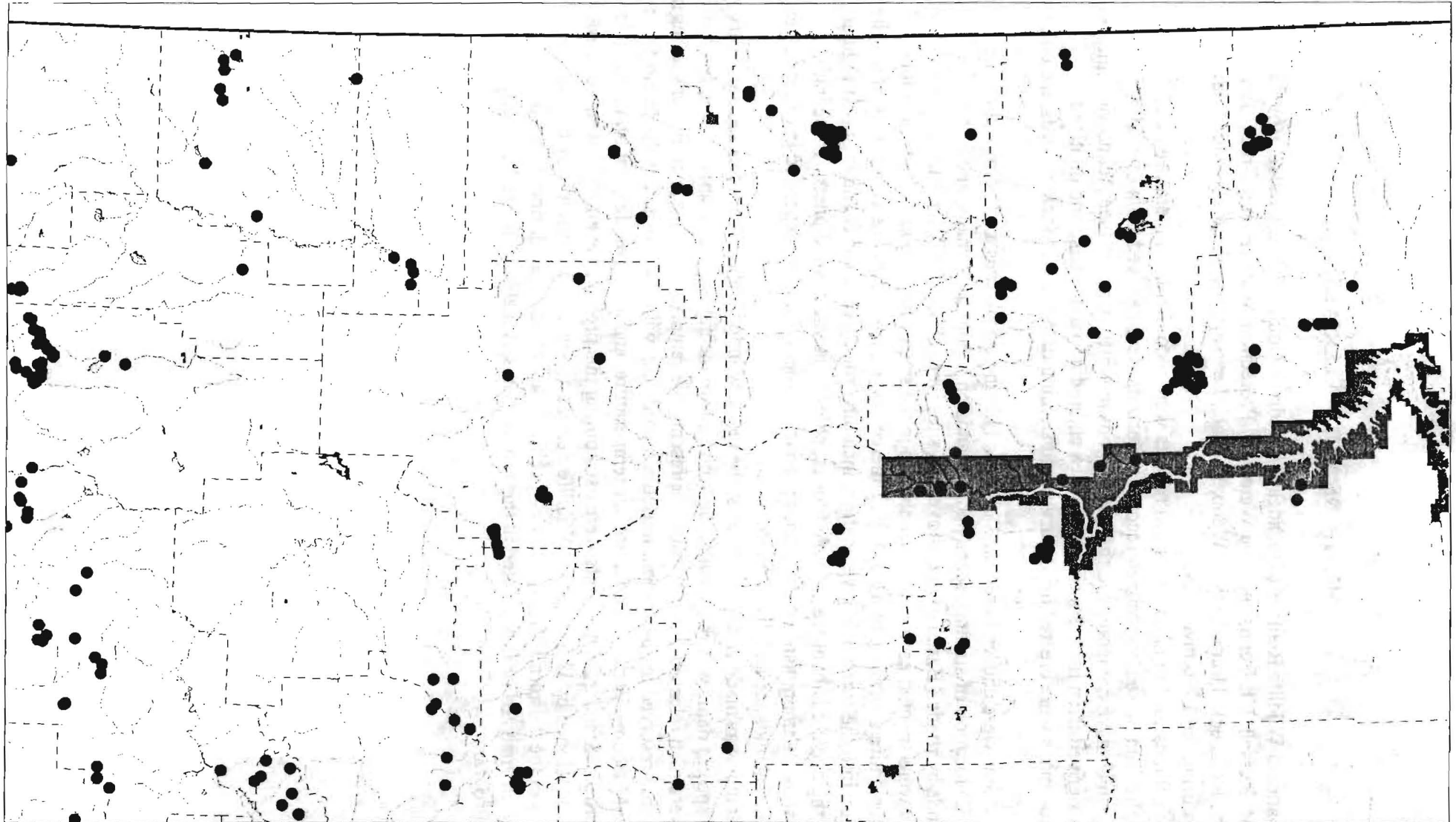
Six National Wildlife Refuges (Thibadeau, Creedman Coulee, Black Coulee, Bowdoin, Charles M. Russell, UL Bend) and nine Waterfowl Protection Areas (Foster Creek, Jarina, Kingsbury, Korsbeck, Holm, Brown, Webb, Dyrdaahl, Pearse) in north-central Montana were surveyed during the 1996 inventory.

Historical locations of amphibians and reptiles were recorded from literature (see Bibliography) and museum specimen records. Records were received from over 20 major museums which have computerized their collections in North America (see Acknowledgments). Locations derived from these sources have been entered into a database and digitized. Distribution maps were created using survey and sighting data and historical records, including specimens.

Survey sites were chosen based on 3 criteria: 1) high priority sites as determined by the USFWS; 2) location of streams, seeps and wetlands on topographic maps; and 3) accessibility of the wetlands by roads. Based on the above, 3-6 sites were chosen daily for surveys. Six minutes to 2 hours were spent at each site, depending upon the size of the area and what was found. Initially, the entire shoreline, or a major part thereof, was searched by walking slowly along the edge and up into the surrounding vegetation, including rolling over rocks and logs. At regular intervals, the aquatic habitat was sampled for tadpoles or larvae using dipnets. If the initial sampling showed amphibian/reptile species present, further effort was expended in order to get some idea of abundance and distribution.

An attempt was made to capture at least the first few individuals of a species seen at a survey site. The species name was recorded along with developmental stage and sex (if possible); the animals were then released. On occasion, representative samples of the more common species in an area were preserved for permanent museum records and will be deposited at the Idaho State University Museum. Water temperature, air temperature, and a general description of the area were recorded. Standard data sheets were used during this project; the amphibian survey data sheet was developed by U.S. Fish and Wildlife Service and is used extensively by a variety of researchers in the western U.S. Much site-specific data was gathered during these surveys; not all data has been analyzed or is presented in this report, but is available from the Montana Natural Heritage Program.

Herp Survey Locations



Locations from the Montana Natural Heritage Program, January 20, 1997

0 10 20 30 40 50 Miles

RESULTS AND DISCUSSION

General Summary

A total of 37 sites was surveyed in May through July 1996 of which 25 had one or more amphibian or reptile species present (Appendix 1). Localized areas across the entire region were covered in the inventory; included were 9 Waterfowl Protection Areas (WPAs) and 6 National Wildlife Refuge (NWR's). Although no species were found at 12 sites, their absence may have been due to the time of day, weather conditions, or other factors at the time of sampling.

Five amphibian species and three reptile species were detected during the 1996 site surveys on USFWS administered lands (Appendix 2). Amphibian and reptile species, and number of WPA/NWR's ("units") where detected, included Tiger Salamander (*Ambystoma tigrinum*) at 3 units, Western Chorus Frog (*Pseudacris triseriata*) at 11 units, Woodhouse's Toad (*Bufo woodhousii*) at 1 unit, Great Plains Toad (*Bufo cognatus*) at 1 unit, Northern Leopard Frog (*Rana pipiens*) at 1 unit, Painted Turtle (*Chrysemys picta*) at 3 units, Common Garter Snake (*Thamnophis sirtalis*) at 1 unit, and Plains Garter Snake (*Thamnophis radix*) at 2 units.

Greatest detected diversity was on or near Charles M. Russell National Wildlife Refuge (CMR), which included all species encountered in 1996 except Plains Garter Snake; this species was detected on the adjacent UL Bend NWR, however, and probably occurs on the CMR as well. Almost 33% of all site surveys during the 1996 inventory were on or near the CMR, which is the largest unit on which site surveys were conducted. No amphibians or reptiles were noted on three USFWS units, one species on five units, two species on 4 units, three species on one unit, and seven species on one unit. No species were detected on 12, one species on 15, two species on 6, three species on 3, and four species on 1 of the site surveys.

Opportunistic sightings on USFWS units in 1996 added three species not reported during site surveys: Gopher Snake (*Pituophis catenifer*), Western Hognose Snake (*Heterodon nasicus*), Racer (*Coluber constrictor*). Historical records and earlier surveys indicated the presence of four additional species on USFWS lands not encountered during the 1996 inventory: Plains Spadefoot (*Scaphiopus bombifrons*), Spiny Softshell (*Trionyx spiniferus*), Short-horned Lizard (*Phrynosoma douglasi*), Western Rattlesnake (*Crotalus viridis*).

In addition to the 37 site surveys on USFWS units, there were 132 site surveys in 1996 on other public lands (mostly BLM) in the region, and 36 opportunistic sightings (i.e. road kills, chance observations) for which data are available and the sightings considered reliable. Survey results included Tiger Salamander at 3 sites, Western Chorus Frog at 32 sites, Northern Leopard Frog at 10 sites, Plains Spadefoot at 2 sites, Painted Turtle at 5 sites, Plains Garter Snake at 8 sites and Western Terrestrial Garter Snake (*Thamnophis elegans*) at 1 site. These surveys and opportunistic encounters in 1996 included three species not recorded at the USFWS units during the 1996 inventory: Plains Spadefoot, Western Terrestrial Garter Snake, Western Rattlesnake.

The following accounts are organized by USFWS unit, beginning with eight NWR's (including two not visited in 1996) and followed by nine WPA's. Included in each account are a description of the 1996 survey results and a summary of species previously documented from each unit and in the MTNHP database in Helena.

USFWS Unit Accounts

Black Coulee National Wildlife Refuge. One survey was conducted at this unit on 10 July. Two tadpoles of the Western Chorus Frog, confirming breeding, were sampled during 30 sweeps. There are no additional records of amphibians or reptiles for this refuge in the MTNHP database.

Benton Lake National Wildlife Refuge. No surveys were conducted on this refuge in 1996. There are records of four species (Tiger Salamander, Western Chorus Frog, Painted Turtle, Plains Garter Snake) for this refuge in the MTNHP database.

Bowdoin National Wildlife Refuge. Four surveys were conducted at this unit, three on 20 June and one on 25 July. Two species were noted, one each on two 20 June surveys: one adult Painted Turtle was seen in the Lakeside Unit near Dry Lake Canal, and Western Chorus Frog (3 adults and about 100 tadpoles) was observed in Goose Island Pond. Two other species were encountered in 1996. Two Gopher Snakes and one Racer were seen near the maintenance shop on 20 June. There are records of two additional species (Tiger Salamander, Western Rattlesnake) for this refuge in the MTNHP database.

Charles M. Russell National Wildlife Refuge. Twelve surveys were conducted on or near this refuge between 13-18 June. A total of seven species was detected at nine sites: Tiger Salamander (larvae) at 1 site, Western Chorus Frog at 8 sites (adults at 5 sites, tadpoles at 4 sites), Woodhouse's Toad at 3 sites (adults at 2 sites, tadpoles at 1 site), Great Plains Toad at 2 sites (adults at 1 site, a juvenile at 1 site), Northern Leopard Frog at 2 sites (1 adult at each), Painted Turtle (one adult) at 1 site, Common Garter Snake (one adult) at 1 site. Woodhouse's Toad was noted at two other sites in 1996: one adult near the mouth of Sand Creek on 14 June, one adult between the N & S Forks of Rock Creek. Three additional species were encountered in 1996. Western Hognose Snake was seen at 2 sites (Rd. 201 2 mi. E of Hwy 191 on 13 June, and 2 mi. S of Rock Creek Marina on 16 June). Gopher Snake was seen at 2 sites (Rd. 201 6 mi. E of Hwy 191 on 13 June, and Knox Ridge Rd. 1 mi. W of Hwy 191 on 14 June). Racer was seen at 1 site (Rd. 217 2 mi. S of Rock Creek Marina on 16 June). There are records of two additional species (Spiny Softshell, Western Rattlesnake) for this refuge in the MTNHP database.

Creedman Coulee National Wildlife Refuge. One survey was conducted at this unit on 3 June. At least ten adult Western Chorus Frogs were heard calling; no tadpoles were captured in 30 sweeps. There are no additional records of amphibians or reptiles for this refuge in the MTNHP database.

Thibadeau National Wildlife Refuge. This site was visited on 3 June, but only a small part (not surveyed) held any water and was a flooded hayfield; nearby Grassy Lake was plowed and dry. There are no records of amphibians or reptiles for this refuge in the MTNHP database.

UL Bend National Wildlife Refuge. Two surveys were conducted on this refuge on 19 June. A total of three species was detected: Western Chorus Frogs (tadpoles) at 2 sites, Painted Turtle (1 adult, 1 juvenile) at 1 site, Plains Garter Snake at 2 sites (5 and 4 adults, respectively). There are no additional records of amphibians or reptiles for this refuge in the MTNHP database.

War Horse National Wildlife Refuge. No surveys were conducted on this refuge in 1996. There are records of three species (Western Chorus Frog, Plains Spadefoot, Northern Leopard Frog) for this refuge in the MTNHP database.

Brown Waterfowl Protection Area. One survey was conducted at this WPA on 1 June. One species, Western Chorus Frog (about 50 calling adults), was observed; no tadpoles were caught in 15 sweeps. There are no additional records of amphibians or reptiles for this WPA in the MTNHP database.

Dyrdahl Waterfowl Protection Area. One survey was conducted at this WPA on 11 July. One species, Western Chorus Frog (3 tadpoles), was captured in 50 sweeps of three potholes. There are no additional records of amphibians or reptiles for this WPA in the MTNHP database.

Foster Creek Waterfowl Protection Area. One survey was conducted at this WPA on 22 July. No amphibian or reptile species were encountered. There are no records of amphibians or reptiles for this WPA in the MTNHP database.

Holm Waterfowl Protection Area. Two surveys were conducted at this WPA on 4 June. Two species were noted: Western Chorus Frog (about 50 calling adults, no tadpoles in 20 sweeps) was noted at Holm Reservoir, Western Chorus Frog (about 100 adults, no tadpoles in 20 sweeps) and Plains Garter Snake (1 adult) were noted at McLaren Reservoir. There are no additional records of amphibians or reptiles for this WPA in the MTNHP database.

Jarina Waterfowl Protection Area. Two surveys were conducted at this WPA on 31 May. One species was noted: Western Chorus Frog (5 calling adults, no tadpoles) was noted at an unnamed lake 0.5 mi. ENE of NW Howe Lake. No species were noted in NE Howe Lake. There are no additional records of amphibians or reptiles for this WPA in the MTNHP database.

Kingsbury Waterfowl Protection Area. Four surveys were conducted at this WPA on 3 June. A total of two species was detected on 2 surveys: Tiger Salamander (larvae and eggs) at 2 sites, Western Chorus Frogs (4 calling adults) at 1 site. There are records of four additional amphibian and reptile species (Short-horned Lizard, Gopher Snake, Racer, Western Rattlesnake) for this WPA in the MTNHP database.

Korsbeck Waterfowl Protection Area. Four surveys were conducted at this WPA on 4 June. A total of two species was detected on 3 surveys: Tiger Salamander (1 larvae in Pond 1) at 1 site, Western Chorus Frogs at 3 sites (8 calling adults and 90 tadpoles in Pond 1, 60 tadpoles in Pond 2, 185 tadpoles in East Pond). There are no additional records of amphibians or reptiles for this

WPA in the MTNHP database.

Pearse Waterfowl Protection Area. One survey was conducted at this WPA on 25 July. No amphibian or reptile species were encountered. There are no records of amphibians or reptiles for this WPA in the MTNHP database.

Webb Waterfowl Protection Area. One survey was conducted at this WPA on 11 July. No amphibian (50 sweeps) or reptile species were encountered. There are no records of amphibians or reptiles for this WPA in the MTNHP database.

RECOMMENDATIONS

- 1) Incidental sightings of amphibians and reptiles from the USFWS units should be recorded and forwarded to the Natural Heritage Program. Of particular interest are all observations and locations of breeding amphibians (tadpoles and/or eggs) and all reptiles. Use Reichel and Flath (1995) as an identification aid. Vouchers of amphibian tadpoles can be sent to the Natural Heritage program for identification.
- 2) Due to the time constraints and the large area covered in the 1996 survey, it should not be regarded as a definitive index of all the amphibians and reptiles or their presence on the USFWS units. The secretive habits of many amphibians and reptiles, and our lack of knowledge regarding their reproductive behavior make it difficult to assess their overall status. We recommend that additional surveys be conducted.
- 3) When more breeding locations for amphibians are known, long-term monitoring of typical marsh-pond habitats should be set up at several sites in order to evaluate relative numbers and breeding success of the more common species: Tiger Salamander, Western Chorus Frog, Woodhouse's Toad, Northern Leopard Frog, Plains Garter Snake, and Common Garter Snake. Particular attention needs to be given to any toad and Northern Leopard Frog breeding sites found. Life history and ecology of the amphibians in Montana is poorly known for most species. Long-term monitoring will give us information on timing of breeding and habitat requirements needed for successful reproduction.

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APPENDIX 1.

SITES SURVEYED DURING 1996

AMPHIBIAN AND REPTILE INVENTORY

Appendix 1. Sites surveyed during 1996 amphibian and reptile inventory.

Site	Location	Elevation	Date	Start Time
Black Coulee NWR	T34N R25E S24 NW4	----	10 Jul 96	1730
Bowdoin NWR	T31N R31E S23 SE4	2224	20 Jun 96	1215
Bowdoin NWR*	T31N R31E S26 NW4	2220	20 Jun 96	1310
Bowdoin NWR	T30N R31E S15 NW4	2220	20 Jun 96	1435
Bowdoin NWR*	T30N R31E S05 SW4SE4	2220	25 Jul 96	0915
Charles M. Russell NWR	T21N R24E S01 NW4	2283	13 Jun 96	1210
Charles M. Russell NWR	T21N R25E S02 NW4	2296	13 Jun 96	1415
Charles M. Russell NWR (BLM land)	T23N R25E S26 NW4SW4	2953	13 Jun 96	1630
Charles M. Russell NWR	T21N R24E S08 NE4	2887	14 Jun 96	1105
Charles M. Russell NWR*	T21N R25E S06 SW4	2461	14 Jun 96	1550
Charles M. Russell NWR	T21N R37E S13 NW4	2280	14 Jun 96	2210
Charles M. Russell NWR (BLM land)	T21N R37E S35 NW4	2526	15 Jun 96	0930
Charles M. Russell NWR	T23N R43E S21 NE4	2313	16 Jun 96	1130
Charles M. Russell NWR	T23N R43E S21 SW4	2330	16 Jun 96	1530
Charles M. Russell NWR*	T23N R43E S32 NE4	2297	16 Jun 96	1435
Charles M. Russell NWR*	T21N R43E S28 NE4	2295	16 Jun 96	2010
Charles M. Russell NWR	T22N R32E S18 NW4	2297	18 Jun 96	1630
Creedman Coulee NWR	T37N R15E S16 SE4SW4	----	03 Jun 96	1520
Lake Thibadeau NWR*	T35N R16E S26, 35, 36	----	03 Jun 96	1710
UL Bend NWR	T22N R30E S23 NW4	2392	19 Jun 96	1030
UL Bend NWR	T22N R29E S33 SW4	2461	19 Jun 96	1405
Brown WPA	T37N R02W S34NW, S35NW	----	01 Jun 96	1915
Dyrdahl WPA	T36N R29E S05 SE4	2850	11 Jul 96	2006
Foster Creek WPA*	T25N R05W S06 NW4	3930	22 Jul 96	1630
Holm WPA (Holm Res.)	T36N R18E S31 S2	----	04 Jun 96	1950
Holm WPA (McLaren Res.)	T35N R18E S06 S2	----	04 Jun 96	1915
Jarina WPA	T28N R09W S20 NW4NE4	4680	31 May 96	1620
Jarina WPA*	T28N R09W S20 SW4NW4	4730	31 May 96	1750
Kingsbury WPA	T21N R11E S17 NW4NE4	3200	03 Jun 96	1145

* Sites with no herps found during survey

Appendix 1 (cont.). Sites surveyed during 1996 amphibian and reptile inventory.

Site	Location	Elevation	Date	Start Time
Kingsbury WPA*	T21N R11E S07 NE4SE4	3270	03 Jun 96	1300
Kingsbury WPA	T21N R11E S18 SE4NW4	3220	03 Jun 96	1415
Kingsbury WPA*	T21N R11E S07 SE4SE4	----	03 Jun 96	1530
Korsbeck WPA* (Pond 3)	T28N R27E S05 NW4	----	04 Jun 96	1825
Korsbeck WPA (Pond 2)	T29N R27E S31 SW4	2590	04 Jun 96	1755
Korsbeck WPA (East Pond)	T29N R27E S32 SE4NW4	2580	04 Jun 96	1515
Korsbeck WPA (Pond 1)	T29N R27E S31 E2	2770	04 Jun 96	1655
Pearse WPA*	T31N R32E S18 SW4	2228	25 Jul 96	1215
Webb WPA*	T37N R29E S30 NW4	2800	11 Jul 96	1930

* Sites with no herps found during survey

APPENDIX 2.

AMPHIBIANS AND REPTILES

OBSERVED DURING SURVEYS IN 1996

Appendix 2. Amphibians and reptiles observed on USFWS units during 1996 site surveys.
Asterisk means breeding confirmed.

Site	Person Hrs:min	Total number of adults/juv of each species observed ¹						
		AMTI	BUWO	BUCO	PSTR	RAPI	CHPI	THSI THRA
Black Coulee	0:35				0/*			
Bowdoin (Lakeside Unit)	0:45						1/0	
Bowdoin (Goose Is. Unit)	0:35				2/*			
CMR (White Bottoms)	0:40		0/*		10/0		1/0	
CMR (Rock Cr. Res.)	1:00				0/*	1/0		
CMR (BLM Deep Res.)	0:40				10/0			
CMR (Sand Cr. Trail pond)	0:50				0/*			
CMR (Hell Cr. Mouth)	1:50		90/0	90/0	90/0			
CMR (BLM Hart Cr.)	2:00			0/*	1/*			
CMR (N Fork Rock Cr.)	1:30	0/*						
CMR (pond, Rds 817 & 836)	1:00		3/0		0/*	1/0		1/0
CMR (Fourchette Bay)	0:30				10/0			
Creedman Coulee	0:40				10/0			
UL Bend (Valentine Res.)	1:00				0/*		1/1	5/0
UL Bend (Res. Rd 212,201)	0:40				0/*			4/0
Brown	0:40				50/0			
Dyrdahl	0:30				0/*			
Holm (Holm Res.)	0:20				50/0			
Holm (McLaren Res.)	0:30				90/0			1/0
Jarina ENE of NW Howe Lk	1:25				5/0			
Kingsbury (N pond)	0:15	0/*			4/0			
Kingsbury (NW pond)	0:06	0/*						
Korsbeck (pond 2)	0:15				0/*			
Korsbeck (E pond)	0:15				0/*			
Korsbeck (pond 1)	0:45	0/*			8/*			

¹ AMTI (*Ambystoma tigrinum*), BUWO (*Bufo woodhousii*), BUCO (*B. cognatus*), PSTR (*Pseudacris triseriata*), RAPI (*Rana pipiens*), CHPI (*Chrysemys picta*), THSI (*Thamnophis sirtalis*), THRA (*T. radix*).